



BENCHTEST

# Psion Organiser II

*A battery-powered, handheld computer which is usable on the move and an extension to the PC back at base, is a dream come true. Mike Gross-Niklaus looks at the versatile and highly programmable Psion Organiser II, and one of its plug-in ROM cartridges, the Pocket Spreadsheet.*





If you use a desktop computer to maintain your appointments diary, price lists and other business information files, you have a problem when you leave the office. You can't take the computer with you and there may not be time to print an up-to-date hard copy. Even if you use a laptop it has to be carted around like an extra briefcase and plugged into the mains from time to time.

My dream computer consists of two parts: the base unit is a standard office PC; the other is a small pocket or handheld computer. You use it to look up information and enter into it orders, notes, appointments, and so on, as they occur. Whenever you are in the office, you connect it to the base computer and let them communicate.

The Psion Organiser Mark II is a fully-fledged computer which fulfils all the requirements of my 'dream' pocket unit. It has up to 32k ROM, 16k user RAM and 256k of EPROM Datapaks or battery-powered Rampaks used in a similar way to diskettes. The ROM contains ready-to-use routines to record and remind you of appointments, allows you to reference and update databases, acts as a clock and calendar, provides eight independent repeatable alarms and a Basic-like calculation facility.

In addition, the Psion Organiser has a programming environment called OPL, a rich mixture of features based on Basic, Pascal, C and database commands. You can use it to create fast modular routines called into action by

a single key-press. Using an optional Comms Link (see the box), you can transfer data and programs to and from another computer or send the information to a serial printer.

## Hardware

The Psion measures 14x8x3cms, slightly larger than a packet of cigarettes and, at 225 grams, somewhat heavier. It consists of an inner box containing the keyboard and other hardware, and an outer sheath of tough grey plastic into which the box slides, leaving just the screen and serial I/O port in view. On the back is a thin rubber strip which stops it from sliding about on a desk.

The LCD screen provides two lines of 16 characters each, and a contrast wheel enables you to adjust the viewing conditions — although I had no trouble reading screen information. If the machine is left unused for more than five minutes, the screen blanks out to save the battery.

The keyboard contains 36 multi-function, calculator-style keys. Using shift keys you can enter upper and lower-case letters, digits, math operators and some, but not all, of the usual ASCII symbols. In addition, there are cursor, Delete and Enter keys and two others performing system functions. The key-top legends are thinner than on earlier models but have still been applied as a layer on top of each key. After a month or so of prodding at them, parts of the legends on the more frequently used keys

wore though. A pity — this being one of the very few black marks I would give the Psion.

Inside, the machine uses the HD6303X microprocessor together with custom-designed CMOS support chips. The manual lists several useful system variables which you can PEEK and POKE. It also mentions that you can enter machine code programs but gives no indication as to how these might be run.

Instead of disk drives, the Psion has sockets at the back of the machine for two plug-in memory cartridges. These may be either EPROM, battery-powered RAM or ROM program packs. They come in various capacities from 8-128k.

The Psion can both read and write to a Datapak. Once information has been written, no power is needed to maintain it. One adverse characteristic of these Datapaks is that writing to them makes heavy demands on the battery. Another is that when updating a record, the new version is written to an unoccupied location in the Datapak, and the old record marked to show that it is deleted. Thus, eventually, the Datapak fills up with a collection of current and deleted records.

You can copy the current records either to RAM or to a Datapak or Rampak in the other socket. Then you can erase (Psion calls it re-format) the full Datapak by illuminating it with ultra-violet light for about 30 minutes. Psion dealers provide a formatting service or you can purchase the Psion Formatter.

The Rampak is equipped with a five-year battery. Writing is much faster than with a Datapak. Unlike a Datapak, when items are erased, the space is immediately and automatically available for re-use.

At the top of the Psion is a socket into which fits the optional Comms Link. This is a ROM extension cartridge with a cable which interfaces to a standard RS232 serial port on a printer or another computer. When this cartridge is plugged in, additional ROM-based code to support serial communications is made available to the Psion. The RS232 facilities have recently been updated and are surprisingly sophisticated.

The Psion is normally powered by a PP3 dry or rechargeable battery. Its life will depend to a large extent on how often you write to Datapaks. Using a rechargeable battery, I filled one 32k Datapak and copied the current records to the other before receiving the 'battery low' signal. Later I left an Organiser, crammed with RAM programs, for three months without battery failure. When the time comes to change batteries, you have 90 seconds to effect the change before the RAM-stored information is lost. Psion also offers a mains adaptor as an optional extra.

## Built-in features of the Psion Organiser II

**TIME** The Psion includes a calendar and clock which you view and set by selecting TIME from the main menu.

**ALARM** Associated with the clock are eight independent alarms, each of which can be set for any time up to a week ahead. They can be self-cancelling or repeat every hour, day or week. They will sound even if the Psion is turned off.

**CALC** The calculator facilities include all the normal arithmetic functions, any number of brackets and ten memories. In addition, as you enter an expression, it appears on the top line of the screen. Pressing Enter displays the result on the line below. You can then edit the expression to produce a different result. You can include OPL functions and also those you have written yourself and stored in RAM or one of the Datapaks. The ten memories can be accessed or set up by your OPL routines. The effect is similar to the direct screen use of Basic's 'PRINT' and 'GOSUB' commands and results in a powerful calculation facility.

**DIARY** The diary is divided into 15-minute time-slots. You can enter appointment details or messages up to 64 characters long. When displayed, long messages automatically scroll sideways. To each time-slot you can add an alarm set to sound up to 59 minutes before the start of that slot. Having idly entered such an alarm last Christmas morning — yes, I did receive a Psion as a present — it was quite uncanny, while entering an OPL program four months later, to have an alarm sound and the message entered 120 days earlier scroll across the screen.

You can find messages in the diary by specifying a sequence of text characters (for example 'Smith' to find all appointments with Mr Smith). You can save diaries to RAM or Datapak, then copy them to a printer or to another computer. You can erase old, unwanted entries with a single command.

**SAVE** allows you to enter variable length records into a database called MAIN in any format up to 16 lines (254 characters total). **FIND** searches for records containing a specified sequence of characters. **ERASE** operates like FIND but then offers you the option of deleting the record found.

Different MAIN databases can be set up in RAM and on each Datapak or Rampak. You can process them with OPL routines and send out or load data through the serial port.



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## Software

When you turn on the Psion, the screen displays a menu of instantly available facilities:

FIND SAVE DIARY  
CALC PROG ERASE  
TIME INFO ALARM  
COPY RESET OFF

You select a menu item in a manner similar to that used by desktop computer software: either with the cursor keys and Enter or with the initial letter of the option.

Psion markets several software packages which are supplied on ROM cartridges. Once fitted, an extra item is automatically added to the main menu. Select this and the package starts running. One of these

packages, Pocket Spreadsheet, is reviewed below.

## OPL

The Psion contains a programming environment called OPL (Organiser Programming Language). To create a program, you choose PROG from the main menu. You enter the source code via the keyboard. This was the only time I had problems with the small screen, since I like to see a large portion of the source code while I am editing. The solution was to write down the program on paper first.

The source code is translated into object code which is then saved and run. Errors thrown up by the 'Translate' or 'Run' phase put you back into

the source code for correction. Programs can be copied to a Datapak or Rampak and run from there. When you are certain that the program is performing properly, you can delete the source code to save space. You can add program names to the Psion's opening menu.

OPL is a mixture of Basic variables and key-words together with Pascal or C-style control structures and functions. Thrown in for good measure is a comprehensive set of database management commands.

String, integer and real variables are supported, both single and as one-dimensional arrays. Variables can be declared as Global or Local. Control structures include GOTO,

## The Psion Organiser Pocket Spreadsheet

The Pocket Spreadsheet is one of the growing number of Rompak-based software packages offered by Psion for use in the Organiser II pocket computer. It provides a full-facility spreadsheet with features similar to those used in Lotus 1-2-3 and Symphony. Using the optional Comms Link to connect the Organiser to a desktop PC, you can download Lotus-format spreadsheets into the Organiser, use them 'out on the road', then transfer the updated versions back to the PC at the end of the day.

The package is provided as a plug-in Rompak and a 130-page, four by six inch manual. When you plug in the Rompak, an additional item, 'PLAN', is added to the Organiser's main menu.

Psion has been particularly ingenious in implementing a spreadsheet on a computer with a display screen of only 2 lines x 16 characters, and has adopted the view that with most spreadsheet applications, you concentrate on just one or two cells at a time. The default screen display shows two rows and one or more columns. Alternative display formats take the place of the status line on large-screen spreadsheets, and this shows the true contents (for example, formula expression) of a cell.

The spreadsheet is 26 columns wide, A-Z, and 99 rows deep. Psion has used every trick in the book to keep down spreadsheet memory use. Blank cells use no space. Identical formulas are stored once, and shared by all the cells containing them. The column and row limits mean that cell references are stored in two bytes each. Lotus-style Absolute and Mixed cell references can be used.



*The Psion Organiser II is a robust, pocket computer which is no larger than a Filofax-type diary — although at 225 grams it is considerably heavier. The outer casing is made of tough grey plastic, part of which slides back to reveal the 36 multi-function, calculator-style keyboard and the 2 lines x 16 characters LCD screen. The Organiser comes with plug-in ROM applications, one of which, the Pocket Spreadsheet, is shown in place above.*

Commands are implemented from menus in typical spreadsheet fashion. The main menu and two sub-menus provide most of the familiar spreadsheet commands.

With such a small display area, there is no need for a window facility, but you can set up fixed titles in Row 1 and/or Column A. You can protect spreadsheet files with passwords and encryption.

Values are stored in variable-length, BCD floating-point format, compatible with Lotus spreadsheets, to an accuracy of 12 digits. Calculation is 'Natural order', meaning that you can position formula cells where you like. This cuts down the amount of scrolling which the lack of win-

dows might otherwise require.

The functions (see boxes below) provided by the Pocket Spreadsheet match similar ones to those in Lotus

### Functions

ABS	EXP	MIN	SORT
ACOS	FALSE	MOD	STD
ASIN	FV	MONTH	SUM
ATAN	HLOOKUP	NA	TAN
ATAN2	IF	NPV	TODAY
AVG	INT	OPL	TRUE
CHOOSE	IRR	PI	VAR
COS	ISERR	PMT	VLOOKUP
COUNT	ISNA	PV	YEAR
DATA	LN	RAND	
DAY	LOG	ROUND	
ERR	MAX	SIN	



IF... ELSEIF... ENDIF, DO... UNTIL and WHILE... ENDWH.

Subroutines are created, named, translated and saved separately, resulting in a modular approach to Psion programming. You call a subroutine by including its name as a key-word in your program followed by parameters in brackets. I ended up with several utility procedures, saved as object code only on a Datapak, which in effect became my personal extensions to OPL.

MENU is one example of OPL's powerful functions. It enhances the modular routine concept.

For instance:

```
M=MENU("SALES    PURCHASE
QUIT")
```

When this instruction is met, the menu:

SALES PURCHASE

QUIT

appears on the screen. Variable M will be set to 1, 2 or 3 according to the selection made and could be processed as follows:

```
IF M=1
SAL:
ELSEIF M=2
PUR:
ELSE
CLOSE
```

where SAL and PUR are separately written routines.

OPL also contains functions for opening a file or database, moving to the first, next or specified record and for finding specified text and returning the record number containing it.

## Documentation

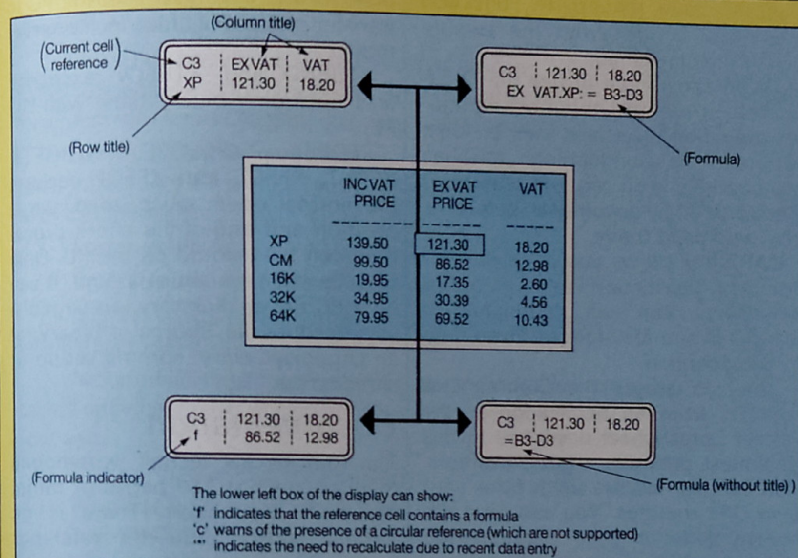
As a professional writer of computer manuals, I set high standards for my

own and other peoples' work in this area. I feel that a good manual should contain a 'Learning' section with user procedures set out in a logical sequence leading off from what the reader can be assumed to know already. There should also be a detailed reference section, a full list of contents and a usable index. I also believe that manuals should be easy to fold back on themselves to occupy as little space as possible.

The Psion manual meets these ideals completely in a 220-page, four by six inch wire-bound book. Everything you need is there; it's easy to use and there are very few errors.

## Prices

The Psion with 8k RAM is priced at £99. However, a usable system will for many people require the XP model with 16k RAM, at least one Datapak



The Pocket Spreadsheet provides a full-facility spreadsheet with features similar to those used in Lotus 1-2-3 and Symphony

## Spreadsheet functions

### ● The MAIN menu:

- GRID Displays a sub-menu and is similar to the Lotus 'Worksheet' command
- FILE Displays a menu of file operations
- ALTER Allows you to edit cell contents
- GOTO Moves you to the specified cell
- TITLES Allows you to display or suppress titles previously set up in row 1 and/or column A
- DISPLAY Selects the screen display mode
- QUIT Exits the Pocket Spreadsheet program and returns you to the Organiser's main menu

### ● The GRID menu:

- DELETE Deletes a range of cells
- FORMAT Sets default and cell range formats
- WIDTHS Sets default and individual column widths
- PRINT Outputs a cell range to the Comms Link
- COPY Copies a cell range, adjusting formulas
- RECALC Recalculates the spreadsheet
- ZAP Erases the contents of the spreadsheet and restores default settings

### ● The FILE menu:

- LOAD Loads spreadsheet file from memory, Datapak or Rampak
- SAVE Saves spreadsheet file to memory, Datapak or Rampak
- IMPORT Loads .DIF or .WKS file via Comms Link
- EXPORT Sends .DIF or .WKS file to the Comms Link
- DIR Lists spreadsheet files stored in the Organiser
- ERASE Deletes a spreadsheet file

1-2-3 and Symphony in syntax and operation.

The function OPL is a very powerful enhancement to the normal spreadsheet facilities. It allows you to include as a spreadsheet function any OPL routine you have written and stored in the Organiser's memory, Datapaks or Rampaks. Also, when you install the Pocket Spreadsheet, extra commands are added to the OPL language to read one or more cell values or strings from the spreadsheet. The effect is to provide an enhanced Macro facility which is far more sophisticated and easy to use than the rather unwieldy Lotus Macro language.

## Documentation

The manual is in the Psion Organiser house style: four by six inches and wire-bound. Its 130 pages contain tutorial and reference sections, a contents list and a good index. There are several errors among the examples in the tutorial, ranging from specifying the wrong menu item to assuming the wrong cell is current.

As an experienced teacher of spreadsheet procedures, I found this very irritating, and a newcomer to spreadsheets would be totally bewildered. This is a pity because, that apart, the tutorial, examples and reference section are well-written.

## Conclusion

The Pocket Spreadsheet enables you to take a full-featured spreadsheet environment with you on your daily travels and transfer the updated sheet to your main computer when back at base. The ability to use external custom-written Organiser routines as spreadsheet functions, and for OPL routines to extract spreadsheet data automatically, is a superb integration of the Organiser's facilities. The uses to which spreadsheets can now be put stretches even further towards the infinite.



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## The Comms Link

The optional Comms Link provides RS232 communications between the Organiser II and the rest of the computing world. At its simplest, it enables you to print Organiser data or list OPL programs on a serial printer. More significantly, you can use it to transfer files both ways between the Organiser and a desktop computer. The feature that rocks me back on my heels is the ability to use it with the Organiser II to issue MS-DOS-type commands to access and process files held on a PC hard disk. In other words, the Organiser now has the ability to use a PC-compatible computer as a file server.

The Comms Link is provided as a combination of hardware and both ROM-based and disk-based software. It is an enhanced version of the RS232 Link previously marketed by Psion, and it comes with a 160-page manual.

The hardware consists of a one-metre long cable with a standard 25-pin serial plug on one end and a custom-designed casing on the other. The plug connects to a PC-compatible serial port. The casing contains a 32k ROM with communications software extensions to the Organiser's operating system and a plug which fits into one end of the Organiser. It clicks into place and requires a latch to be pushed before it can be removed.

When you have plugged the Link into the Organiser, an extra item, 'Comms', is added to the main menu. Selecting this allows you to access a variety of communications facilities via several sub-menus. (See the box below for the full list.)

The 'SETUP' facility enables you to

set all RS232 parameters. Baud rates of 50 to 9600 are supported together with even, odd or no parity, and so on. Handshaking can use XON, RTS, DTR, or combinations of these. The communications protocol can be set to Xmodem or a special protocol designed by Psion. This is intended to be used with Psion communications software in the PC — supplied on a 5¼in disk as part of the package. The Psion protocol uses CRC error-checking techniques, similar to those used for disk information transfer, to provide fast, reliable transmission of binary files. You can set a timeout of between 1-255 seconds, and have the received and transmitted EOL, EOF and TRN codes automatically translated into appropriate characters.

AUTO cycles through all combinations of baud rate, parity, bits and stop until contact with the remote device is established.

TERM allows you to use the Organiser as a terminal to a host computer providing electronic mail or telex services. Session-logging facilities are provided. You can edit telexes or electronic mail documents before or after you send them.

CAPTURE allows you to receive incoming information into a buffer where you can edit, retransmit or leave it *in situ* for more received data to be appended.

You can access the Comms Link facilities from an application — the Pocket Spreadsheet described in this Benchtest provides a good example. You can also access them from your own OPL routines. You can print the source code or send it to another computer. I developed several programs by creating and editing the source code on a PC and transmitting the resultant file to the Organiser for translation and running.

When you install Comms Link, several extra keywords and functions are added to OPL. These include:

**LSET**, which sets up the RS232 parameters;

**LINPUT\$**, which awaits a line of data;

**LPRINT**, which outputs data to the RS232 port; and

**TRIG\$**, which transmits data then awaits a line of data.

Provided it is running the communications program CL, supplied by Psion on a disk as part of the Comms Link package, you can use a PC as a file server to the Organiser.

BOOT will run Organiser programs, particularly communications applications, which are stored on a PC disk.

A set of procedures are provided both for the Organiser and the PC to transfer and access files in file-server mode.

XTSEND and XTRECV exchange files (including binary files) with the PC.

XFOPEN, XFCLOSE, XFRGET\$, XFPUT, XFPOS and XFEof perform the normal open, close, read, write, position and end-of-file check procedures on files stored on the PC. Only one file can be open at a time. It can be a PC file or directory, an Organiser procedure file, source or binary, or an Organiser diary, comms set-up or spreadsheet file.

## Documentation

The four by six inches, wire-bound manual contains 160 pages of rather technical information. There is no tutorial section but the reference material is in an easily followed logical order. However, I found the index to be below Psion's usually high standard.

## Conclusion

A Comms Link is absolutely essential if you are to make the most of the Organiser in an office environment. This latest version makes it easier, but not simple, for novices to use. The file server and session-logging software extend yet again the horizons of the remarkable Organiser.

information processing need, while the RS232 Comms Link enables it to communicate easily with the rest of the computer world.

The Psion Organiser II is a handheld computer that more than adequately meets the need for a portable extension to the office computer.

Mike Gross-Niklaus has been involved with programming, teaching and writing about computers for over 20 years. He was software and training manager for Commodore Business Machines UK for several years before starting his own company, Personal Computer Training Ltd.

Psion is on (01) 723 9408.

END

### Comms Link functions

**TRANSMIT** Transmits a file or procedure across the RS232 port

**RECEIVE** Receives a file or procedure across the RS232 port

**SETUP** Sets up RS232 communications parameters

**TERM** Becomes a terminal

**AUTO** Works out what RS232 parameters the remote device needs

**CAPTURE** Captures incoming data, edits it and re-transmits it

**BOOT** Runs an OPL procedure stored on a connected PC

and the Comms Link. I also strongly recommend purchasing the Psion Datapak reformatter. A Rampak is very useful during program development.

At the time of writing, the cost of such a typical system is:

Psion XP	£139.50
32k Datapak	£34.95
Comms Link	£59.95
Formatter	£44.95
32k Rampak	£79.95
Pocket Spreadsheet	£39.95

Some of these prices are rather high, particularly the Rampak, so it will be

interesting to see what happens as more manufacturers start catering for this growing market.

## Conclusion

The Psion Organiser Mark II is an excellent, robust and highly usable pocket computer of considerable power, albeit with a tiny display screen. However, at the moment it is rather pricey; and I also hope that something will be done about the key-top legends on future keyboards. The OPL programming environment allows you to develop routines to meet almost any